

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
13 January 2005 (13.01.2005)

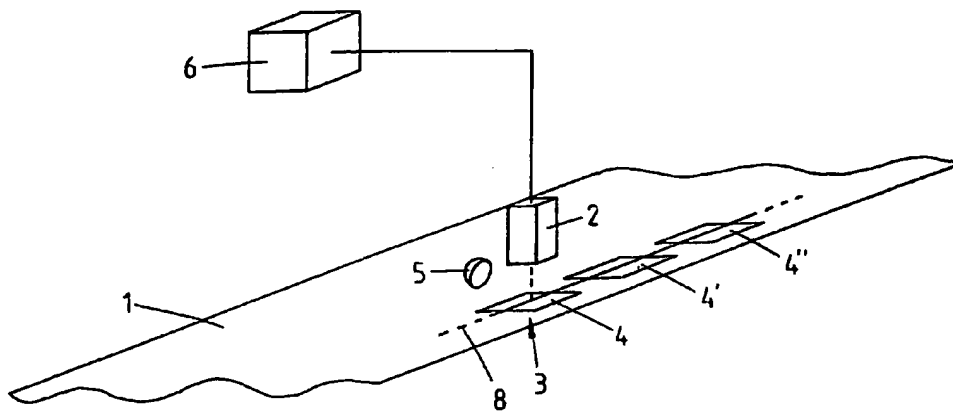
PCT

(10) International Publication Number  
**WO 2005/004042 A1**

- (51) International Patent Classification<sup>7</sup>: **G06K 9/62**,  
H04N 7/18
- (21) International Application Number:  
PCT/SE2004/001052
- (22) International Filing Date: 28 June 2004 (28.06.2004)
- (25) Filing Language: Swedish
- (26) Publication Language: English
- (30) Priority Data:  
0302011-2 8 July 2003 (08.07.2003) SE
- (71) Applicant (for all designated States except US): **STORA ENSO AB** [SE/SE]; S-791 80 Falun (SE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **EKBERG, Magnus** [SE/SE]; Bergslagsvägen 65 B, S-774 31 Avesta (SE). **ERSSON, Per-Olof** [SE/SE]; Engelbrektsgatan 55 A, S-791 73 Falun (SE). **HENNINGSSON, Olle** [SE/SE]; Slättavägen 11, S-791 75 Falun (SE). **OLDBERG, Karin** [SE/SE]; Gustavstorg 2 D, S-791 70 Falun (SE). **OLDBERG, Tomas** [SE/SE]; Gustavstorg 2 D, S-791 70 Falun (SE). **RIGERL, Karl-Heinz** [SE/SE]; Blindgatan 45, S-791 72 Falun (SE). **WIGGE, Bosse** [SE/SE]; Bastuvägen 9, S-783 50 Gustafs (SE).
- (74) Agent: **NILSSON, Katarina**; Stora Enso AB, IP-department, Box 9090, S-650 09 Karlstad (SE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR ANALYSING SURFACE STRUCTURE IN PAPER OR BOARD



(57) Abstract: A method for analysing in real-time in a paper machine or board machine the surface structure of a web (1) of paper or board which method comprises the direction of an imaging system towards a pre-determined area (3) of the web (1), the arrangement of an illumination system to illuminate the region from a pre-determined direction with obliquely incident light, and the arrangement of an image analysis system in association with the imaging system. Furthermore, the method comprises, according to the invention, an image capture step (7) in which the imaging system is caused to take several digital images of the web under the said oblique incident illumination and during a pre-determined period, which images form an image sequence that images a series of surface sections (4, 4', 4'') along a band (8) in the web (1), and an evaluation step (9) that is carried out by the image analysis system and which comprises an image analysis step (11), which in turn comprises a first analysis operation (16) in which the variance of the pixel values in each pixel row in each image in the image sequence is determined within a pre-determined wavelength band, and a second analysis operation (17) in which the mean value of the variances of all pixel rows of all images in the image sequence is calculated. The invention also concerns a device for the execution of the method.

BEST AVAILABLE COPY

WO 2005/004042 A1



**Published:**

— with international search report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**BEST AVAILABLE COPY**